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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/800,987	03/07/2001	Lawrence A. Kennedy	27611/34370B	6848
4743	7590	04/14/2004	EXAMINER	
MARSHALL, GERSTEIN & BORUN LLP 6300 SEARS TOWER 233 S. WACKER DRIVE CHICAGO, IL 60606			RIDLEY, BASIA ANNA	
			ART UNIT	PAPER NUMBER
			1764	

DATE MAILED: 04/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/800,987

Applicant(s)

KENNEDY ET AL.

Examiner

Basia Ridley



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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 March 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 030701.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The information disclosure statement filed on 23 December 1999 as Paper 2 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the following document(s) referred to therein has not been considered as to the merits:

- "Kennedy et al. 10<sup>th</sup> Intern. Symp. on Transport Phenomena, Kyoto, Japan, Nov.30-Dec.3, 1997, 451-55", as only pages 451 and 2-5 were included.

### ***Specification***

2. Acknowledgment is made of applicant's claim for domestic priority under 35 U.S.C. 120. The specification should be amended to include current status of all referenced nonprovisional parent applications.

### ***Drawings***

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because Fig. 1 includes the following reference sign(s) not mentioned in the description: "20". A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "24" in Fig. 2 has been used to designate both an insulating material surrounding vessel 102 (see P16/L1-2) and an area inside said vessel 102 not mentioned in

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specification. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

5. The drawings are objected as failing to comply with 37 CFR 1.84(q) because Fig. 1 contains a lead line without corresponding reference number. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

#### ***Claim Objections***

6. Claims 4, 8-9 and 16 are objected to because of the following informalities:

- in claim 4, "the hydrocarbon" should be replaced with --the C<sub>1</sub> to C<sub>5</sub> hydrocarbons--;
- in claim 8, "the equivalence ratio is" should be replaced with --the reactant mixture has an equivalence ratio of hydrocarbon to oxygen of--;
- in claim 16, "the porous material" should be replaced with --the fixed bed--.

Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claim(s) 1-9, 12-14 and 17-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Hasche (USP 2,845,335).

Regarding claim 1, Hasche discloses a method of continuously generating combustion products from a fuel-rich reactant mixture, the method comprising:

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- flowing the reactant mixture through a heated zone of a reactor, the reactor containing a porous fixed bed and operating at a temperature sufficient to result in a super-adiabatic combustion of the reactant mixture (Fig. 1, C1/L15-48 and C3/L5-C5/L21); and
- combusting the reactant mixture in the heated zone to generate the combustion products and heat, the heat being sufficient to maintain the operating temperature of the heated zone for the super-adiabatic combustion of additional reactant mixture(C1/L15-48 and C3/L5-C5/L21).

Regarding claims 2-9, 12-14 and 17-18, Hasche discloses all of the claim limitations as set forth above, additionally the reference discloses the method wherein:

- the reactant mixture comprises oxygen and one or more C<sub>1</sub> to C<sub>5</sub> hydrocarbons (C18/L26-37);
- the combustion products comprise hydrogen, carbon dioxide, and one or more C<sub>1</sub> to C<sub>5</sub> hydrocarbons (C18/L26-37);
- the hydrocarbon comprises ethylene, propylene, butylenes, acetylene or mixtures thereof (C15/L22-29 & C18/L26-37);
- the operating temperature of the heated zone is about 800°C to about 2500°C (C8/L24-30);
- the operating temperature of the heated zone is about 1000°C to about 1700°C (C8/L24-30);
- the reactant mixture has an equivalence ratio of hydrocarbon to oxygen of greater than about 1.2 to about 20 (C9/L70-C10/L4);
- the equivalence ratio is about 2.5 to about 15 (C9/L70-C10/L4);
- the equivalence ratio is about 3 to about 10 (C9/L70-C10/L4);
- the fixed bed has porosity sufficient to allow gas flow therethrough (C13/L41-C14/L8);
- the fixed bed has porosity of about 10% to about 90% (C13/L41-C14/L8);
- the fixed bed comprises pellets made from a material selected from the group consisting of

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alumina, silicon carbide, silicon nitride and quartz (C7/L3-30);

- the heat is a transient thermal wave (C1/L15-48 and C3/L5-C5/L21); and
- the thermal wave is coupled to the flow of the reactant mixture (C1/L15-48 and C3/L5-C5/L21).

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim(s) 10-11 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hasche (USP 2,845,335), as applied to claims 1 and 12 above.

Regarding claims 10-11, Hasche discloses all of the claim limitations as set forth above. Additionally the reference discloses the method wherein the reactor is operated at sub-atmospheric and super-atmospheric internal pressures (ranging from about 0.1 to 5 atmospheres), wherein the operating pressure depends on desired products (C9/L7-31). While the reference does not explicitly disclose the internal pressures ranging to pressures up to 100 atmospheres the specific operating pressures are not considered to confer patentability to the claims. As the composition of the product stream is a variable that can be modified, among others, by adjusting said operating pressures (see C9/L7-31), the precise operating pressure would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed pressure cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the operating pressures in the method

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of Hasche to obtain the desired product stream (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (*In re Aller*, 105 USPQ 223).

Regarding claim 16, Hasche discloses all of the claim limitations as set forth above. Additionally the reference discloses the method wherein the reaction in the heated zone is performed catalytically or non-catalytically (C7/L3-50), but the reference does not explicitly disclose the heated zone having any specific catalytic content. The content of catalyst in reaction zone relative to the porous material is not considered to confer patentability to the claims. As the operating conditions, for example reaction temperature and conversion efficiency, are variables that can be modified, among others, by adjusting the weight percent of catalyst in the reaction zone, the actual weight percent of catalyst in the heated zone would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed weight percentages cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the weight percentage of catalyst in the heated reaction zone of Hasche to obtain the desired reaction temperatures and conversion efficiencies (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (*In re Aller*, 105 USPQ 223).

11. Claim(s) 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hasche (USP 2,845,335), as applied to claim 14 above, in view of Brophy et al. (USP 4,767,569).

Regarding claim 15, Hasche discloses all of the claim limitations as set forth above.

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Additionally the reference discloses the method wherein the pellets in reaction zone are conventional (C7/L3-50), but the reference does not disclose any specific dimensions for said pellets.

Brophy et al. teaches a method using refractory pellets which are active for partial combustion of hydrocarbons at conditions similar to the ones disclosed in Hasche to produce similar products (C2/L11-50) wherein the pellets have a diameter of about 0.05 mm to about 10 mm (C2/L26-32).

As instant specification is silent to unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the refractory pellets of Brophy et al. having a diameter of about 0.05 mm to about 10 mm in the heated reaction zone of Hasche, since doing so would amount to nothing more than a use of a known component for its intended use in a known environment to accomplish entirely expected result.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

### ***Conclusion***

13. In view of the foregoing, none of the claims are allowed.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Basia Ridley, whose telephone number is (571) 272-1453.

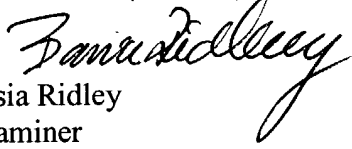


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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola, can be reached on (571) 272-1444.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Technical Center 1700 General Information Telephone No. is (571) 272-1700. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Questions on access to the Private PAIR system should be directed to the Electronic Business Center (EBC) at (866) 217-9197 (toll-free).

  
Basia Ridley  
Examiner

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BR  
April 13, 2004